

Information and Meaning in Evolutionary Processes

The most significant legacy of philosophical skepticism is the realization that our concepts, beliefs, and theories are social constructs. This belief has led to epistemological relativism, or the thesis that because there is no ultimate truth about the world, theory preferences are only a matter of opinion. Using evolutionary theory as the key to the naturalization of epistemology, William F. Harms seeks to develop the tools necessary to transform the philosophical study of knowledge into a proper scientific discipline.

This book will appeal to students and professionals in epistemology and the philosophy of science. William F. Harms is Research Associate at the Centre for Applied Ethics, University of British Columbia, and Philosophy Instructor at Seattle Central Community College.





CAMBRIDGE STUDIES IN PHILOSOPHY AND BIOLOGY

General Editor

Michael Ruse Florida State University

Advisory Board

Michael Donoghue Yale University
Jean Gayon University of Paris
Jonathan Hodge University of Leeds
Jane Maienschein Arizona State University

Jesús Mosterín Instituto de Filosofía (Spanish Research Council)
Elliott Sober University of Wisconsin

Alfred I. Tauber The Immune Self: Theory or Metaphor?

Elliott Sober From a Biological Point of View

Robert Brandon Concepts and Methods in Evolutionary Biology

Peter Godfrey-Smith Complexity and the Function of Mind in Nature

William A. Rottschaefer The Biology and Psychology of Moral Agency

Sahotra Sarkar Genetics and Reductionism

Jean Gayon Darwinism's Struggle for Survival

Jane Maienschein and Michael Ruse (eds.) Biology and the Foundation of Ethics

Jack Wilson Biological Individuality

Richard Creath and Jane Maienschein (eds.) Biology and Epistemology
Alexander Rosenberg Darwinism in Philosophy, Social Science, and Policy

Peter Beurton, Raphael Falk, and Hans-Jörg Rheinberger (eds.) The Concept of the Gene in Development and Evolution

David Hull Science and Selection

James G. Lennox Aristotle's Philosophy of Biology

Marc Ereshefsky The Poverty of the Linnaean Hierarchy

Kim Sterelny The Evolution of Agency and Other Essays

William S. Cooper The Evolution of Reason

Peter McLaughlin What Functions Explain

Hecht Orzack and Elliott Sober (eds.) Adaptationism and Optimality

Bryan G. Norton Searching for Sustainability

Sandra D. Mitchell Biological Complexity and Integrative Pluralism

Joseph LaPorte Natural Kinds and Conceptual Change

Greg Cooper The Science of the Struggle for Existence

Jason Scott Robert Embryology, Epigenesis, and Evolution





Information and Meaning in Evolutionary Processes

WILLIAM F. HARMS

University of British Columbia





CAMBRIDGE UNIVERSITY PRESS

32 Avenue of the Americas, New York NY 10013-2473, USA

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9780521815147

© William F. Harms 2004

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2004

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data

Harms, William F.

Information and meaning in evolutionary processes / William F. Harms.

p. cm. - (Cambridge studies in philosophy and biology)

Includes bibliographical references and index.

ISBN 0-521-81514-2

1. Knowledge, Theory of. 2. Evolution. I. Title. II. Series.

BD177.H37 2004 121 – dc21

2003055312

ISBN 978-0-521-81514-7 Hardback ISBN 978-0-521-03921-5 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.



Here then, is a kind of pre-established harmony between the course of nature and the succession of our ideas; . . . As nature has taught us the use of our limbs, without giving us the knowledge of the muscles and nerves, by which they are actuated; so has she implanted in us an instinct, which carries forward the thought in a correspondent course to that which she has established among external objects; though we are ignorant of those powers and forces, on which this regular course and succession of objects totally depends.

David Hume, Enquiry, §V.





Contents

	Acknowledgments	page X1
	Introduction	1
	PART I. GENERALIZING EVOLUTIONARY THEORY	
1.	Replicator Theories	15
2.	Ontologies of Evolution and Cultural Transmission	52
I	PART II. MODELING INFORMATION FLOW IN EVOLUTIONARY P	ROCESSES
3.	Population Dynamics	81
4.	Information Theory	109
5.	Selection as an Information-Transfer Process	133
6.	Multilevel Information Transfer	150
7.	Information in Internal States	164
	PART III. MEANING CONVENTIONS AND NORMATIVITY	Y
8.	Primitive Content	189
9.	Is and Ought	218
Epilogue: Paley's Watch and Other Stories		241
Notes		247
Ap	pendix: Proof of Information Gain under Frequency-Independ	lent
Discrete Replicator Dynamics for Population of n Types		253
References		259
Index		265





Acknowledgments

I would like to extend my grateful thanks to the many people who have played roles, small and large, in the development of the ideas herein, and in bringing this book to completion. These include Jeff Barrett, Michael Bradie, Werner Callebaut, Eric Cave, Peter Danielson, Peter Godfrey-Smith, Karl Hufbauer, David Hull, Libby Logerwell, Ned McClennen, Ruth Millikan, David Shoemaker, Elliot Sober, Kim Sterelny, and Bill Wimsatt. Special thanks go out to Michael Ruse for suggesting this book in the first place, and seeing it through to the end; and to Brian Skyrms for showing me the power of dynamical models in philosophy.